ATIONAL TUNA WEEK, NOVEMBER 3-12

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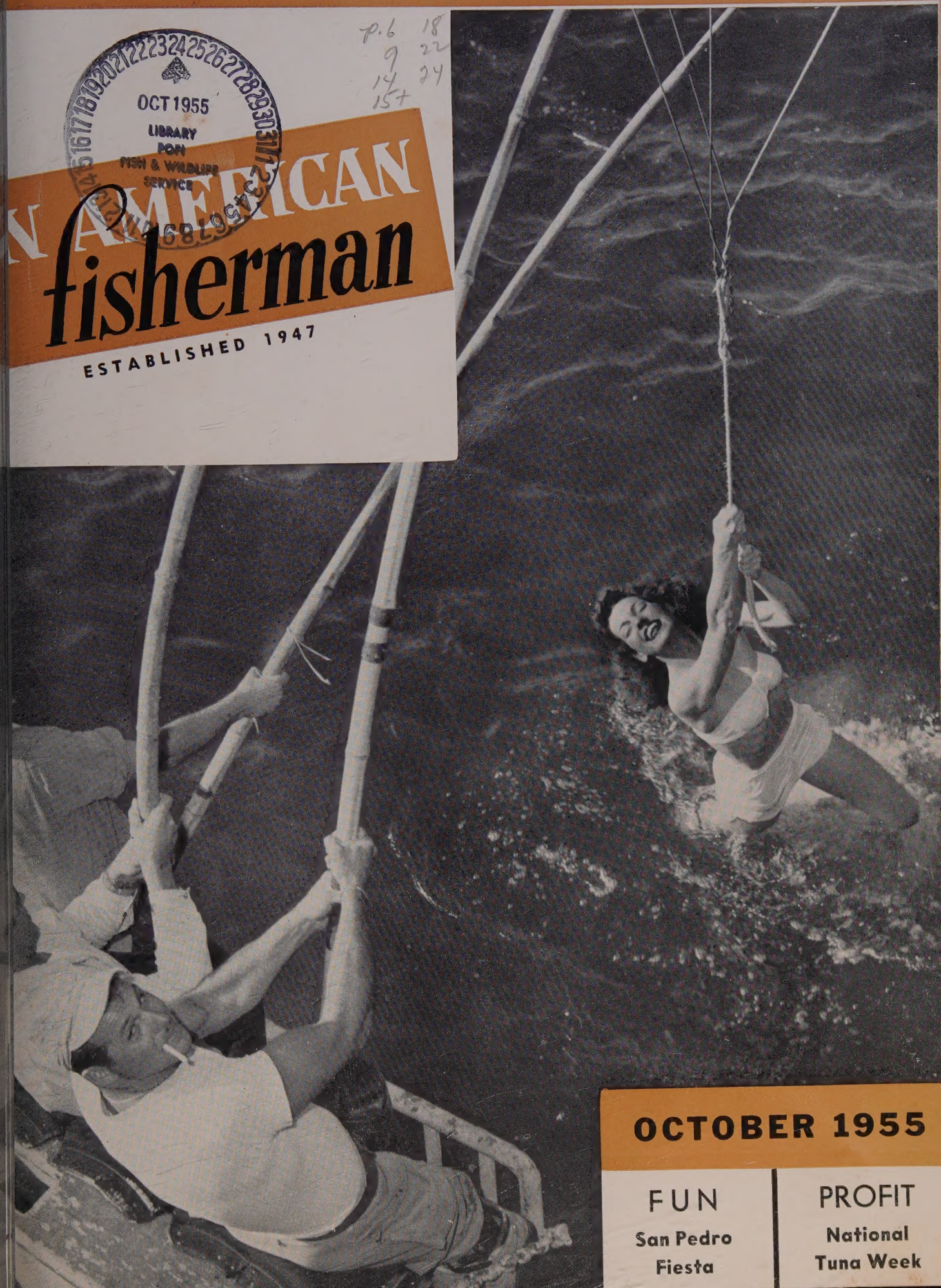

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PAN AMERICAN FISHERMAN

WATER POWER AND SALMON

WHILE the tuna industry is having its trouble, the same can be said of salmon—only in a different direction. The trouble in the Northwest is basic with the development of greater water power facilities. A recent bulletin from the Fisheries Association of British Columbia covers the matter in this manner:

While the fishing industry is entirely sympathetic toward those who follow the star of power, it isn't prepared to sit idly by if the search for new water power sources threatens one of the world's great endowments. The sad history of depletion of salmon rivers has been written in many parts of the world and with the Fraser River literally the last of the great salmon streams, it is unthinkable that it too should go on the sacrificial block. Those who would offer up to the kilowatt kings talk glibly of "providing" for the fish. However, those same people have never discussed the situation with a salmon.

The fishery scientists, entirely in sympathy with the power and progress theme, have yet to come up with a method which will provide upward and downward passage of salmon with no sacrifice of the fish. Their efforts to discover such a method have been sincere almost to the point of frenzy, but the tiny salmon fingerlings have failed to cooperate. It seems you can't talk engineering to a salmon.

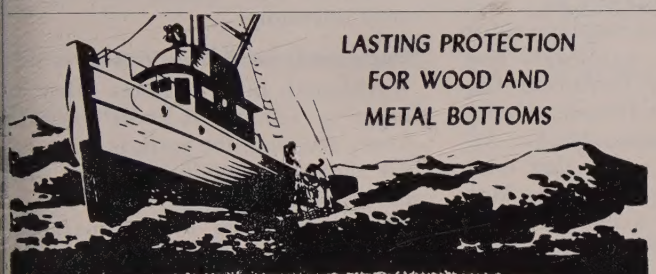
Among plans being bruited about for increasing B.C.'s power development is one which would divert the headwaters of the Columbia into the Fraser. Such a move would increase the power potential of the lower mainland of B.C. Fish ladders and fishways would be provided, according to the power engineers, and everything would be lovely in the garden. But once again, the salmon won't listen.

It has been established that changes in temperature in the waters of the spawning rivers has a direct effect on the survival of the fingerlings. To divert the waters of one river into another with the subsequent change in temperature could cause untold damage.

To reverse the process, when delays occur in the migration of the salmon intent on spawning, their fecundity is vastly impaired. It has been pointed out that with a great run on the Fraser, there have been delays up to four days in the progress of the spawners. If the delay is increased comparatively for a series of dams—and a series of dams is what is being mooted—no one can estimate the loss to the fishery.

While water power protagonists talk of 10 dams on the Fraser, those with the interests of the fishery at heart declare there are other sites which could provide as much power with little ill effect on the precious salmon run. The power engineers decry the cost of such a project but they neglect to calculate the cost to the province of jeopardizing the salmon industry, an industry conservatively estimated as contributing $100,000,000 annually to the economy of the province.

Besides, in a few years the era of atomic and hydrogen power is expected to change the whole concept of industrial motivation; some say in two years, others in five to ten years. Surely the sacrifice of a sorely needed source of protein food is a terrible price to pay for haste. *



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Pacific Telephone

For Fishery Work

Employment Possibilities In Alask

By FRED W. HIPKINS
Fishery Marketing Specialist
FWS Branch of Commercial Fisheries

DURING World War II there was a serious shortage of manpower in the fishing industry in the Pacific Northwest and Alaska; however, that condition no longer exists. As a result, inexperienced personnel must now compete for jobs with experienced workers whose capabilities are known to the employers. Obviously, applicants with special skills stand a better chance of obtaining jobs than do inexperienced ones.

In recent years, it has been necessary to impose rigid regulations in the interests of conservation of the Alaskan fisheries. These regulations have reduced the fishing effort by shortening seasons, curtailing fishing gear, and closing certain areas to commercial fishing. A number of canneries have consolidated their operations as a result of this regulatory action, which has further decreased the employment possibilities.

Try Seattle First

Hiring in nearly all cases is done on a personal interview basis at Seattle. This applies both to cannery help and to help on fishing vessels. Because of this fact, applicants should not come to Alaska seeking work but should arrange for an interview with the company selected at their Seattle headquarters.

If an applicant wishes to take a chance on coming to Alaska to find work, sufficient funds should be available to make the return trip if work is not available. An applicant coming to Alaska should remember that in addition to the expensive transportation, the cost of feed and lodging is from 25 to 30% higher than similar necessities in the States.

All persons traveling to and from Alaska must be able to comply with the regulations of the McCarran Act of 1952. This act requires that all persons entering the United States from Alaska pass through immigration inspection upon their arrival. For this reason, anyone seeking employment in Alaska should make sure that he has proper identification before leaving the continental United States.

For work either on fishing vessels or in canneries, union membership is

an asset, although the Taft-Hartley law permits employment subject to later union membership where "union shop" contracts are negotiated. Most branches of Alaska's fishing industry are unionized.

For information on employment in Alaska in general, applicants may write to the Alaska Territorial Employment Service at Juneau, Alaska, or Box 159, Ketchikan, Alaska. Applicants should be aware that there is an increasing pressure on the Alaskan fishery industry to consider Alaskan citizens first before hiring outside help.

Alaska is not the untouched wilderness many people believe. Although there are still many undeveloped fishery resources, the majority of these require the expenditure of large amounts of capital for exploitation. Principal undeveloped fisheries include shellfish, such as crabs, shrimp and clams, and bottomfish. Salmon and halibut are being fished to the limit at present, and herring are now being fully exploited on all known fishing grounds.

Employment in Canneries

There is no central employment agency for cannery workers, either in the United States or in Alaska. Each cannery does its own hiring, usually in Seattle, from about March to May of each year. Letters of application should be addressed to the individual company. Applicants should give age, physical condition, training, working experience, and a other qualifications.

A list of salmon canners can obtained upon request from the rector, Fish and Wildlife Service, S. Department of the Interior, Wa ington 25, D. C., or from field offi of the Service at Juneau and Ket kan, Alaska, or at 2725 Montl Blvd., Seattle 2, Washington.

Workers hired in Seattle, Washi ton, are provided transportation traveltime pay at the expense of t cannery. Most canneries prov monthly employees with room board. Where these are not provid the employee usually received ad tional subsistence compensation. M cannery workers receive two to months' employment (summer early fall).

Wage rates for cannery emp ment are good but subject to revis each season, through negotiations tween the labor unions and the nery operators.

Employment on Fishing Vessels

Although high earnings often made in fishing, in most cases hours are long, the work is hard, the income is moderate. Very o the fishermen actually lose mo when the fishing or the marke conditions are poor. Furtherm with inexperienced workers, seas ness may be a problem.

Usually the hiring is done by di interview with the captain of individual fishing vessel. The rel ance of the captain to hire inexp enced personnel is not surprisin view of the fact that the crew fishing vessel must be a well grated team if the fishing is to A "green" hand is often a hindra rather than a help.

Captains with good catch rec are always able to obtain excel fully experienced crews; those have a record of mediocre earn often must hire some inexperie persons. Thus anyone planning entering the fishery for the first must anticipate difficulty in ob ing employment and, even if suc ful in getting a job, must expect earnings for the first two or t seasons.

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Associate Editor

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About This Issue . . .

"WHEN it rains it pours," certainly has applied to the tuna industry lately. On top of the squabbles about prices for the fish paid by canners, the tuna and mackerel canneries in the San Pedro area were idled for many weeks by a wage dispute between the cannery workers and the cannery operators.

*

From San Pedro the above strike also spread to San Diego, where three canneries with 1400 workers were closed by picket lines . . . seeking to reinforce AFL demands in San Pedro for a new contract. The Westgate-California company filed suit for $50,000 damages against the cannery workers union.

*

Main point of a conference held in Los Angeles last month between top representatives of the United States and Japanese tuna interests: that a joint organization be formed for promoting canned tuna consumption. Japan was urged to begin an advertising campaign in the American market at the same level of expenditures as the American canners—about $1 a case for canned tuna and about $40 a ton for fish. The Japanese delegates returned home to consider the proposition.

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San Pedro Fiesta

AN ESTIMATED 250,000 people crowded the Harbor area at San Pedro for the ninth annual Fishermen's Fiesta, October 1 and 2. The colorful event included booths with food and novelties of various nationalities, carnival-type entertainment, and in the evenings street dancing.

Sunday forenoon a Solemn High Mass at Mary Star of the Sea Catholic Church was largely attended, celebrated by Msgr. George Scott, the pastor. Most of the fishermen are Catholic and of the 21,000-member parish, more than half earn their living from the sea. Other church leaders prayed for the success of the 2300-boat fishing fleet which headquarters here.

Bishop Blesses Fleet

Sunday afternoon on Fisherman's Dock, Bishop Joseph Thomas McGucken blessed the fleet, intoning as he sprinkled holy water from an aspergillum:

"Graciously harken to our prayers, Oh Lord, and with Thy holy hand bless these boats and all who sail hereon as Thou didst deign to bless Noah's ark during the deluge."

In a prepared speech following the blessing, U.S. Secretary of Labor James P. Mitchell said that the nation's unemployment is lower than ever—only 3.3% of the total labor force is presently unemployed—and the Eisenhower administration has helped make the total economy boom. But there's still a few problem areas, and one of them is in connection with the Southern California tuna industry. However, Mitchell added, the administration's leaders will not rest until "the unprofitable segment of our total economy is reduced to its absolute minimum."

In another speech, Gov. Knight said that he would recommend to Congress that it protect domestic tuna fishermen from foreign competition. He said he would recommend a voluntary quota agreement be worked out with Japan to fix amounts of imported tuna.

Under sponsorship of the San Pedro Chamber of Commerce, Skipperette Amelia Nizetich, 17, queen of the fiesta and a senior at Mary Star of the Sea High School, blew a whistle to start a parade of some 50 tinsel-decked fishing boats competing for a $1000 decoration prize.

Boats Win Awards

The sweepstakes award went to the Sea Hawk, entered in the nonsponsored boat class. The boat, decorated with the theme "Toyland," is owned by Angelo Falcone.

First prize in the commercial sponsored boat class went to the Clermont owned by John Evich. The theme o this entry, sponsored by the America Can Co., was "10 Soldiers."

Tagged Albacore Results

California Department of Fish an Game marine biologists aboard th research vessel *N. B. Scofield* suc ceeded in tagging several hundred a bacore during the 1954 season. Sixty four of these fish were tagged an released 60 miles S.W. of Point Con ception, California, on September 2

No tagged albacore were recap tured from this school until 6 months later, when the Japanese fish ing vessel *Sho-Ei-Maru* caught on 280 miles S.E. of Tokyo, Japan. Th second recapture from this lot of 6 occurred 11½ months from the da of tagging. This fish was caught b the American fishing vessel *Quiz Kid* approximately 36 miles south of Lo Coronados Island.

The return from Japan represen the fourth recovery by the Japanes of albacore tagged along the Califo nia coast. These four recoveries dem onstrate that at least part of the alb core population occurring along ou coast during the summer and fa months cross the ocean and appear the Japanese fishery.

The tagged albacore captured b the *Quiz Kid* in September 1955 w tagged during the 1954 season. Th could mean that part of the albaco population, that migrates across th ocean, returns to re-enter the Ame can coastal fishery the following se son.

Miller Freeman Passes

The sudden passing of Miller Freeman came as a shock. The venerable publisher of the *Pacific Fisherman* and several other trade journals was a real friend of the fishing industry. For 50 years he advocated conservation and research and international treaties, three of which he saw reach fruition. He advocated the formation of a Halibut commission and the Sockeye commission and was an advisor of the International North Pacific Sockeye Commission. The State of Washington lost a vigorous leader and the fishing industry a valuable friend.

Report from Washington

Items Gleaned from the Nation's Capital

USY MONTH.--High on the list of important events this month is the meeting in Santiago, Chile, which started September 14 and is running on into arly October. Why so long? Well, it covers a big subject and a broad rea.

In attendance are representatives of the governments of Chile, cuador, Peru, and the United States. The announced purpose was "to hold onversations regarding the conservation of fishery resources of waters f the South Pacific, and to plan appropriate scientific and technical tudies to that end."

You can boil the main subject down to a few words: settlement of he haggling over that 200-mile limit several countries have set on their erritorial waters. Our last reports indicated that progress is being ade in the right directions.

--o--

MPORTANT MEETING.--The importance of the meeting mentioned above is retty well shown by the delegation of top brass in attendance from the nited States:

Delegates: William C. Herrington (Chairman), Special Assistant for isheries and Wildlife, Office of the Under Secretary, Department of tate, and The Honorable John C. Dreier, U.S. Representative to the Council of the Organization of American States.

Advisers: Charles R. Carry, Executive Director, California Fish anners Association, Inc., Terminal Island, Calif.; Wilbert M. Chapman, irector of Investigations, American Tunaboat Association, San Diego, alif.; Milton J. Lindner, Technical Adviser, U.S. Operations Mission, exico, D.F., Mexico; William A. Sanders, Counselor, U.S. Embassy, Santiago, Chile; O. E. Sette, Fish and Wildlife Service, Stanford University, Palo Alto, Calif.; Fred E. Taylor, Office of the Special Assistant for Fisheries and Wildlife, Department of State; William M. Terry, Office of Foreign Activities, Fish and Wildlife Service; and Marjorie M. Whiteman, Assistant Legal Adviser for Inter-American Affairs, Department of State.

--o--

IG SUIT COMING UP.--In Customs Court in New York City on October 18 will e called the suit brought in the name of Star-Kist to test the legality of the present scale of rates on Japanese tuna imports. A battery of top lawyers will endeavor to show that the present tariff--on at least certain types of tuna--discriminate against the best interests of this country.

Expected to be in attendance from California is Donald P. Loker, vice president of Star-Kist Foods, Inc. Also C. R. Carry, manager of the

California Fish Canners Association, if he gets back in time from attending the four-nation meeting in Chile mentioned above. If not, the canning interests will be represented by E. L. Morris of the Tuna Research Foundation, Terminal Island.

--o--

EISENHOWER'S ILLNESS.--Turning from strictly fishery matters for a bit, of course the most excitement in Washington the last few weeks has centered around the sudden heart attack suffered by President Eisenhower out in Denver.

At first there was considerable confusion in the Nation's Capital, marked by a scramble for power among the top government workers, and much maneuvering for position by the aspiring politicians in both Republican and Democratic parties.

At press time Ike was getting along well on the road to recovery, and all America can rejoice over that. Perhaps it's the old story of "missing the water when the well runs dry," but the plain fact is that Eisenhower, while not spectacular, has done a good job.

His leadership on both the national and international levels was growing greater with each passing month, and this unfortunate illness came just when this country's affairs were running along in better shape than ever before and tensions abroad were less serious than for many years.

It is lucky for America that Ike was broad-minded enough to share responsibilities right from the start with the most capable men around him, and they can carry on satisfactorily--particularly Foster Dulles, Charlie Wilson, and that trio of Californians--Nixon, Knowland and Warren.

--o--

ADVISORY COMMITTEE MEETS.--The vigorous program of fishery research and market development which the Fish and Wildlife Service is undertaking received strong endorsement of the Advisory Committee at its meetings in Boston on August 25 and 26, Director John L. Farley of the Fish and Wildlife Service informed Interior Secretary McKay.

The Committee of experts from the commercial fishing industry was particularly pleased with the departmental policy of contracting with educational institutions and private research organizations. A report on accomplishments during the first year of the program was presented by Director Farley, A. W. Anderson, Chief, Branch of Commercial Fisheries, and Dr. L. A. Walford, Chief, Branch of Fishery Biology.

Future meetings of the Committee, according to Director Farley, will be scheduled with two ideas in mind: 1. To provide an opportunity for the Committee to study important recent developments in various fish-producing centers of the United States, and 2. To learn at first-hand of problems confronting segments of the domestic fishing industry. The Committee's next meeting will be held at Long Beach, Calif., in the spring of 1956. In attendance from the West at the Boston meeting were the following members of the Committee: Lawrence Calvert, Seattle, Wash.; Mark L. Edmunds, Garibaldi, Oreg.; Donald P. Loker, Terminal Island, Calif.; Arthur H. Mendonca, San Francisco, Calif.; Thomas F. Sandoz, Astoria, Oreg.

(Continued on page 2)

earch for New lbacore Grounds

ETURN of the U.S. Fish and Wild- life Service fishery research ship *hn R. Manning* to its Pearl Harbor se on September 10 from a 6,000- le exploratory albacore fishing iise to the West Coast and back is announced by Dr. A. L. Tester, rector of the Pacific Oceanic Fish- y Investigations.

The purpose of this voyage, which gan July 15, was to study the dis- bution and abundance of the alba- re, the most valuable of the tunas, roughout the vast stretch of open ean east of Hawaii and on into the astal waters of California, where e only important American fishery r this species is in full swing in e late summer.

Little is known of the occurrence albacore in the open sea between awaii and the West Coast, but it is elieved that there may be possibili- es for the development of commer- al fishing grounds there. The Japa- ese have long fished albacore at the me latitudes farther west, and alba- ore tagged on the California coast ave been recaptured in this Japanese shery, presumably having passed orthwest of Hawaii in their migra- ons.

The present fishery on the Ameri- an coast is very restricted in the uration of its season and the extent f its grounds, and the catch falls nort of the demand of the West oast canneries. The aim of explora- ory fishing is to aid the expansion f the fishery by finding schools of lbacore earlier or later than the xtremes of the present fishing sea- on or outside the geographical lim- s of present operations.

In its exploratory work the *Man- ing* employed both the longline fish- ig gear used by the Japanese in the orthwest Pacific and the trolling echnique of the American fishery. ccording to Tamio Otsu, fishery re- earch biologist in charge on the ruise, trolling was much more pro- uctive than longlining, catching 58 lbacore to the longlines six.

The fishing done by the *Manning* the coastal area was at all times everal hundred miles from the cen- er of activity of the commercial fleet, nd although not highly productive, did result in locating albacore as much as 800 miles north of the grounds where the commercial ves- sels were fishing.

The results of this survey together with the results of other Fish and Wildlife Service vessels operating out on Honolulu and Seattle suggest that in addition to the albacore off the West Coast, there is, during the sum- mer, an important concentration of fish about 1,000 miles north of Hono- lulu. In this area vessels surveying for salmon took large numbers of al- bacore in gill nets, and hydrographic vessels took them on troll lines. The existence of this latter body of fish may be important to Hawaii for they are within practicable range of Hono- lulu.

Sixty-three albacore were tagged on the *Manning* and released in the expectation that subsequent recap- tures will give further insight into the migrations of these wide ranging tuna. Night fishing with lights was done with the object of assessing the abundance of the saury, a small fish of potential value as albacore bait, but no important concentrations were discovered. Sharks of several species were found to be extremely abundant throughout the cruise. A total of 735 were taken on the longlines, with a record day's catch of 100 shares. *

National Tuna Week

AN ADDED boost to the all-inclusive planned publicity campaign for National Tuna Week, November 3 through 12, was accomplished through a tie-up with the famous Fishermen's Fiesta, held at San Pedro, California, the world's largest fishing port.

This event, staged annually by the Southern California fishing industry members, and the citizens of San Pedro, held its ninth 2-day Fiesta, October 1 and 2. Attracting over a half-million persons to the West Coast fishing center to view its colorful boat parade, this event was exploited nationwide . . . with tuna from California being prominently mentioned.

For the first time the Fiesta was televised in color as well as black and white, being jointly sponsored by the California Canners Association and the Tuna Research Foundation.

Amelia Nizetich, a fisherman's daughter, reigned as "skipperette" over the Fiesta, and also was chosen as National Tuna Week Queen.

The Tuna Research Foundation and its member canners have set up special publicity and consumer promotion campaigns to blanket the nation during October and early November. Stress will be placed on national food syndicate outlets, major newspapers, dailies and weeklies.

Sunday supplements and national magazines were serviced with special photos, features and recipes months ago to appear in November issues. TV and radio personalities including Art Linkletter, Tennessee Ernie and other top-notch network programs will mention the week during the November dates.

Women and food editors of both television and radio shows are receiving scripts and recipes highlighting NTW.

Member companies are planning special advertising in various media, and cooperative advertising space has been reserved with several related foods participating.

A National Tuna Week banner is available upon request by contacting the Tuna Research Foundation, Terminal Island, California.

THE Australia Fishery

A Review by the Rural Bank of New South Wales, Australia

Total commercial production from Australia's fisheries last year —about 100 million lb. *landed* weight—appears to have been the largest so far recorded, over 30 per cent greater than the average for the years ended 1938-39. Despite this increase in the gross weight of production, estimates of the average consumption of fish per head in Australia indicate a significant decline (over 20 per cent) on pre-war levels.

A number of factors are responsible for this situation, the most important statistically being a lag in the rate of increase in edible fish supplies derived from local fisheries production and a lower level of imports. With our population about 30% higher than pre-war, total edible fish supplies in 1953-54 were virtually the same as they were 15 years ago.

Trends in Fisheries Production

The major proportion of total fisheries production is fish, as distinct from crustaceans and mollusks (crayfish, crabs, prawns and oysters). The fish catch in 1953-54—75 million lb. landed weight—was the highest for five seasons but only 15% above the pre-war average. Other fisheries production, though still relatively small, had increased more rapidly, and was 31 million lb. landed weight in 1953-54, double the pre-war figure.

Commercial fish production declined during the war years as boats were impressed and manpower moved into other activities. In the years immediately following the war, fishing activity expanded quickly and production from the partly rested fishing grounds showed a substantial increase. By the end of the 'forties, however, the industry had settled down to a level of production little higher than pre-war.

Continuing scientific research has substantially increased our knowledge of our fisheries resources. New and improved techniques, the development of new beds and the exploitation of new species have all contributed to solving the problem of maintaining Australia's fisheries production. As Table 1 suggests, these developments have not yet been reflected in greatly increased fish production, but they have probably meant that output has been maintained at a higher level than might otherwise have been the case.

Australia, unlike most other countries, is comparatively poor in fish resources. Not only are the grounds which are suitable and at present being used for extensive commercial fishing limited in extent, but the stocks of fish to be found in them are also relatively small. In fact, there is the ever-present danger that, unless great care is exercised, they will be seriously overfished. The decline in stocks in some areas is already very evident, to the amateur and professional fisherman alike.

At the same time, however, it has been suggested that there is considerable scope for increased fish production from Australian waters. One authoritative estimate is that 45.5 million lb. of fish could be added to each year's catch (an increase of about 60% on the 1953-54 catch) without depleting fish stocks. Such an increase would come mainly from the development of the extensive fishing grounds known to be available in the Great Australian Bight and from greater exploitation of tuna, barracouta and other fish suitable for canning and smoking. Such an expansion would require an increase in research and other exploratory work and subsequently, the investment of considerable amounts of capital in the fishing industry itself. Much valuable research into both the scientific and technical aspects of expansion has already been done, but more still awaits attention.

Australia's Fish Imports

In 1953-54, imports of fish into Australia were valued at over £4 million. Our dependence on imports is considerable, even though Australians are not heavy consumers of fish. Last year, for example, close to 50% of total fish supplies consumed in Australia were imported.

Although imports of both fresh and frozen fish and smoked or dried fish (coming mainly from the United Kingdom, South Africa and New Zealand) have shown a significant expansion, imports of canned fish are by far the most important item (nearly £2.5 million in 1953-54). It is interesting to note that canned

n imports have not only failed to over their pre-war volume, but o that their composition has sig-icantly changed. Pre-war, the total 29 million lb. included 18.4 llion lb. of salman, 4.7, mil-n lb .of herrings, and 3.8 million .of sardines. Since the war, salmon ports have been consistently at low els, reaching a maximum of only million lb. in 1953-54. Imports sardines (mainly from Norway) d herrings (mainly from the ited Kingdom), on the other hand, ve been significantly greater than fore the war in every year but 52-53. The very limited imports e to dollar shortages of the popu-Canadian salmon, which was so portant an item in pre-war sup-ies, have been only partially offset imporfts from Russia and Japan, d the development of local produc-n.

h Canning in Australia

The fish canning industry was of gligible proportions before World ar II, producing only 600,000 lb. canned fish in 1938-39. Severe strictions of imports and Service mands during the war gave the cessary initial impetus to develop-ent. This expansion was sustained substantial United Kingdom Min-ry of Food orders in the late 'for-s. During the last five years, pro-uction averaged over 7 million lb. year, largely to meet the local mand. Imports in 1950-51 and 951-52 had recovered to over 22 illion lb. compared with 29 million . pre-war, but in 1952-53 and 1953-l they were only 6 million lb. and 5 million lb. respectively.

The bulk of the Australian pack nsists of salmon and barracouta. hile the size of the local industry undoubtedly due, in large meas-e, to the restricted and fluctuating uantity of imports, the longer-term ture of the industry should be ewed in the light of export possi-lities. If present estimates of the otentialities of Australia's tuna and rracouta fisheries are anywhere ear the mark, their economic devel-oment must be considered in rela-on to the maintenance of quality and fficiency standards consistent with substantial and profitable export ade.

ustralia's Fish Exports

As might be expected from a cur-ory inspection of the general fish pply situation in Australia over ast years, exports are of relatively inor significance. In 1953-54, the ecord total of £1,733,000 was earned from all fish exports. Exports of canned fish, which rose sharply to average over 4 million lb. a year just after the war, mainly to meet United Kingdom orders, have declined to less than 1 million in the last four years. This has been more than offset, however, by a sharp increase in the shipments of frozen crayfish tails and other crustaceans. The bulk of these have proved valuable "dollar earners" in the United States, exports of over 4 million lb. to that country last year realizing over £1.5 million. Australia's major competitors in the crayfish exports to North America are New Zealand and South Africa. The products now appear to have become well-established and further development of this trade may be expected.

So far as other fish exports are concerned, the prospects for increased production directed towards the export market seem greatest in relation to tuna. In many respects a substitute for salmon, consumer preferences as well as Japanese competition pose major problems for the large-scale development of tuna, either for the local or oversea markets.

The Outlook

The future prospects for the Australian fishing industry are affected by a variety of factors and influences. The apparent decline in the total demand for fish in Australia is probably mainly accounted for by the restricted supplies of imported fish, especially canned salmon, and the fact that local production has not been able to provide an acceptable substitute.

Differences in qualities and types of fish and fish products are important considerations in winning consumers and expanding a market especially where, as in Australia, fish is consumed in only small quantities and is still, by most consumers, regarded as a luxury food.

There is, undoubtedly, substantial scope for increasing Australian fisheries production by the development of new grounds and improved techniques, and by the education of consumers to appreciate the particular qualities of varieties of fish which have hitherto been largely neglected. Effective publicity and consumer education could possibly reverse the recent decline in fish consumption, particularly if it is combined with positive measures to raise standards of quality and efficiency. For the average Australian consumer alternate food-stuffs are sufficiently plentiful for an adequate diet. But an effective advertising campaign combined with the availability of good quality fish at competitive prices could yield worthwhile results.

In the final analysis, however, future prospects mainly depend on the ability of the fishing industry to attract new capital for investment. The development of new fishing grounds, improved methods of handling and processing fish, require substantial capital resources which, in the main, will probably have to be drawn from sources outside the existing framework of the industries. *

Table 1— AUSTRALIAN FISHERIES PRODUCTION
(landed weight—million lb.)

Period	Fish	Crayfish	Crabs, Oysters & Prawns	Total
Av. 1936-37 to 1938-39	65.1	4.8	10.6	80.5
Av. 1946-47 to 1948-49	77.5	7.9	9.6	95.0
to 1949-50	71.8	13.7	12.4	97.9
to 1950-51	64.0	14.5	11.9	90.4
1951-52	65.0	13.8	10.8	89.6
1952-53	73.0	15.7	12.3	101.0
1953-54	74.9	17.3	14.4	106.6

Table 2— AUSTRALIAN FISH IMPORTS
(million lb.)

Period	Fresh & Frozen	Smoked & Dried	Canned	Others
Av. 1936-37 to 1938-39	9.1	1.0	29.0	1.7
Av. 1946-47 to 1948-49	8.2	1.8	16.2	1.1
1949-50	6.6	7.9	17.5	1.2
1950-51	11.6	7.2	22.7	1.2
1951-52	16.9	6.3	22.6	1.5
1952-53	9.7	6.3	5.8	0.9
1953-54	15.8	5.6	15.5	1.5

Plight of the Tuna Fishermen

By ROBERT K. LAWSON

THE present plight of the Southern California tuna fishing industry has been variously described but the dominant idea always is the catastrophic effect upon the fishing fleet of ever-increasing imports to this country . . . and this article represents the viewpoint of many we have interviewed.

Out of all these contacts, the plain fact emerges that the following major factors are forcing the American fishing fleet out of business:

a. Tuna imports now fulfill more than 50% of the American market for canned tuna.

b. The American fishing fleet cannot compete price-wise with the imports.

c. Tuna imports continue to climb steadily in direct proportion to the American market expansion.

There is every indication the American fleet will provide less than 50% of the tuna canned in 1956. This prospect is not happy in view of the fact the fleet in 1947 held some 91.6%. In addition, the American fleet might have expanded with the market growth to maintain that percentage today with fair competition.

It might be said that 50% of the market today is greater than 90% of the market in 1947. An analysis of the market figures disproves this statement. The American market for canned tuna in 1947 stood at about 7,400,000 cases, and was 12,000,000 cases in 1954. The difference is more than a half million cases.

Back in 1947 a very healthy situation prevailed. The fleet enjoyed the highest prices for tuna and tunalike fishes ever to prevail. At the height of the albacore season that year this specie delivered for $550 per ton. Skipjack had a going rate of $320 per ton, and yellowfin tuna went for $340.

A general price decline occurred during the next few years, as the proportion of foreign imports climbed, and canners sought to adjust American fleet deliveries to foreign import prices. These reached an all-time low rate in 1955 when the canners arbitrarily announced an across-the-board

cut of $40 per ton, fixing albacore at $310, skipjack at $230, and yellowfin at $270.

Following long and costly fleet-canner negotiations, the canners subsequently agreed to split the difference on the price reduction and settled the price at $330 for albacore, $250 for skipjack, and $290 for yellowfin. This cut the American fleet $220 per ton for albacore, $70 per ton for skipjack, and $50 per ton for yellowfin under the 1947 delivery prices.

It is self-evident the price reductions resulted directly from increasing tuna imports. The total American market for canned tuna has shown a general upward trend since 1947. For the first two years of that period the American fleet production was steady at about 91% of the market, with only a little over a half-million cases of imports coming into the country. In 1949 more than a million and a quarter cases of tuna were imported.

The American fleet production remained steady and this influx of imports took up the slack in the market expansion. The following year (1950) saw nearly three million cases of foreign imports arrive, and the buying from the American fleet took a drop of more than a million cases that year. This huge quantity of imports glutted the American market and the American fleet took it on the nose with costly lay-ups.

The American fleet made a slight recovery the following year when imports dropped off almost a quarter million cases. But the imports were back on the bandwagon again in 195 with three and one-half million cases. The next year four and one-half million cases arrived; then 1954 hit the peak with half of the American market filled through imports of 6,000,000 cases.

From an investment standpoint the canners are in to the hilt. A fish cannery is not a portable object such as a fishing vessel, although there is small consolation in this fact from the vessel owner's viewpoint.

The canner has spent thousands of dollars surveying the market . . . and millions to advertise and promote the sale of canned tuna. Just as the canner is firmly intrenched in his plant so he has a firm grip on the American market.

There is little chance for the canner to lose in the long run . . . he can buy imported fish and American fleet-caught fish in such quantities as the market requires and at prices he can afford. He is assured of raw material from whichever source he considers most economical and satisfactory.

This forces the American fishing fleet to bargain for a fair price in competition with cheap-labor countries. The canner has naturally increased his purchase of foreign imports, because it is economically practical; he also guarantees to buy definite quantities. This insures supplies also is a strategic bargaining fact with the American fleet.

The canner needs only to obtain surplus of foreign imports and claim high inventories, and promptly the American fleet must go underground with costly lay-ups until the excessive inventories of imports are dissipated.

To insure a supply of fish from the American fleet, should anything unforseen occur on the import side

(Continued on page 2

Plight of the Tuna Canners

We're damned if we do—we're ruined if we don't!
Facts and figures from the Tuna Research Foundation representing the Southern California Tuna Canneries

HE current distressing situation of the Southern California fishermen only a part of the overall problem nfronting California's fourth larg- industry.

Tuna canners are sympathetic to e fishermen, but the canners are *ught in the middle.*

Canners must buy imported frozen h for their own protection, and for e survival of the industry.

If they do not, Japanese canners ll process their catches, and export e canned product into this country the ruination of all elements of the mestic industry. If that occurs ere will be no one left to buy any sh from American fishermen.

Also the Southern California fish-men and canners are in competi-on with tuna canners located else-here such as the Pacific Northwest, ast Coast, Puerto Rico, Hawaiian lands and Samoa who depend al-ost entirely upon imported raw ma-rial from Japan.

The real threat to the domestic tuna ndustry lies not in the importation f raw material, but the importation f canned tuna, because this not only uts the fisherman and boat owner n the beach, but the canneries and s workers out of business.

The consumer demand for alba-ore, or white meat tuna, has aver-ged two-and-a-half million cases per ear for the last three years. To arrive t this figure requires a minimum of 0,000 tons of fresh or frozen alba-ore. Last year's domestic catch was 3,000 tons, and the average domes-ic landings for the past three years ave been 18,000 tons. Imports have veraged 21,000 tons over the same eriod.

If this demand is not met by the lomestic canner, then the flow of anned albacore will naturally come rom Japan.

The problem facing the entire in-lustry is one of the absence of a quota, and an inadequate tariff on una canned in brine, a situation that as prevailed for many years.

In 1954 alone, imports of canned tuna amounted to 1,500,000 cases against a pre-war average of 337,000 cases, or an increase of almost 500%. (This amount would require two to two-and-a-half times the amount of tuna in the holds of ships recently tied up in San Pedro and San Diego.)

Imports of Japanese tuna since World War II have risen from 15% to 35% of the United States market.

That is the capsule story that confronts the tuna industry. The livelihood and existence of the cannery workers of Terminal Island and San Diego numbering some 10,000 employees, as well as the plight of the fishermen, is at stake.

Japanese cannery workers receive less than $1 per day, the domestic rate is $1.85 per hour.

Obviously a quota on raw frozen fish is not the answer, particularly when the domestic fleet is unable to supply the requirements of the canneries.

Relief on the existing tariff, or a quota on canned imports is the real solution to the problem.

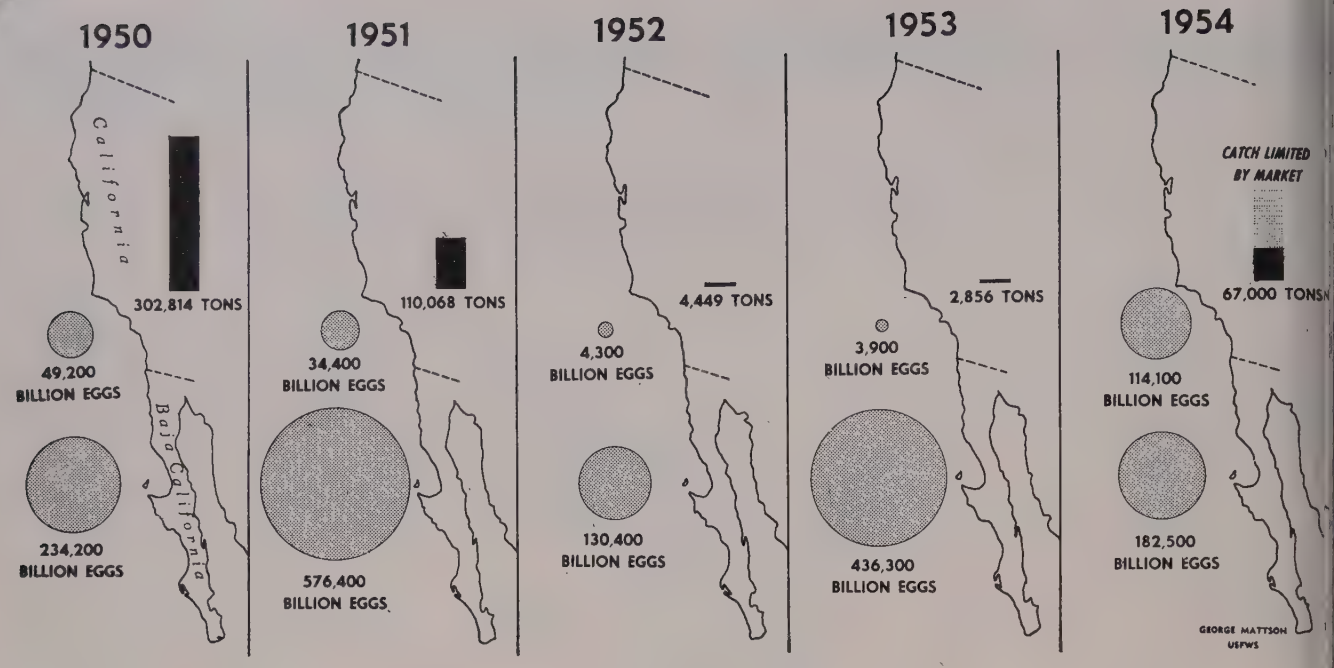
Since the inception of the industry, 50 years ago, canners have spent more than $50,000,000 in advertising and promoting the domestic market.

Japan's advertising and promotional dollars—NONE.

The canners have conducted a vigorous and extensive educational fight in Washington to show Congress and various interested departments such as State, Labor, Commerce and Interior, the harm being done to the tuna industry because of badly conceived tuna tariff laws which do not give adequate protection.

Result—A trade agreement this year giving further concessions to the Japanese tuna industry at the expense of domestic workers.

Summation: Southern California canners agree that Japan should be permitted to have a share of the domestic market in order to support her marginal economy and to retain her within the orbit of free nations, but not to the extent that it jeopardizes the American industry with its millions of dollars of investment, and its employment of thousands of workers. ★



Abundance and distribution of sardine eggs in the spring months and the sardine landings at San Pedro in the fall and winter months. The areas of the circles are proportional to the numbers of eggs and the height of the bars are proportional to the tons landed at San Pedro.

SARDINE SPAWNING SURVEYS

By JOHN C. MARR

Chief, South Pacific Fishery Investigations
U.S. Fish and Wildlife Service

FOLLOWING an exploratory series of cruises in 1949, the location and abundance of Pacific sardine eggs and larvae off the west coast of North America have been determined every year. These egg and larva surveys have been carried out by the South Pacific Fishery Investigations of the U.S. Fish and Wildlife Service as a major part of their work in the California Cooperative Oceanic Fisheries Investigations.

Cooperating agencies include the California Academy of Sciences, California Department of Fish and Game, Hopkins Marine Station of Stanford University and Scripps Institution of Oceanography of the University of California. Scripps and the Service have done the bulk of the oceanographic-biological work (excluding fish scouting cruises) as a joint operation.

Information from the egg and larvae surveys contributes to the solution of many problems. Outstanding among these are:

1. An estimate of the total number of eggs spawned each year provides a starting point in the survival curve of each year class. By observing the reduction in the numbers of larvae with time, it is possible to determine the stage at which mortality is most severe, to seek the causes of this mortality in the environment and thus to determine the cause of large variations in year-class sizes. (Large fluctuations in year-class size are characteristic of most of the great fisheries of the world and in general seem to be related not so much to the number of eggs spawned as to what happens to the eggs after they are are spawned.)

2. An estimate of the size of the spawning population of sardines may be obtained if the following are known: the total number of eggs spawned during the year, the total number spawned by each female and the ratio of males to females in the population.

3. The distribution of spawning fish can be determined from the distribution of eggs, since the eggs hatch in 2½ to 3½ days and cannot drift very far during this period. By no other method can the distribution of adult sardines at time of spawning be so completely described.

I wish particularly to discuss the information derived from (3) above and the application of this information.

A comparison of the distribution of spawning during the spring months with the catch landed at San Pedro in the fall and winter months is of interest. A "northern" spawning center lies off southern California and northern Baja California. A "southern" spawning center lies off central Baja California. In the accompanying figure the numbers of sardine eggs spawned in each of these areas in 1950 through 1954 are shown.

It is obvious that both in absolute numbers and percentage-wise, the number of eggs in the northern center decreased each year from 1951 through 1953. In fact, in 1952 and 1953 the amount of spawning in the northern center was almost negligible. However, in 1954 the amount of spawning in the northern center was the greatest observed in recent years. Compared to 1940 and 1941 (insofar as a comparison is possible—much smaller area was surveyed i

40 and 1941), spawning in this ater in 1954 was considerably less.

What causes these changes in the tribution of sardine spawning? doubtedly they are related, in part least, to concurrent changes in the ean. One feature of the environ- nt that has been intensively inves- ated is temperature. It is known, example, that the sardines which awn in the spring months do so nost entirely in waters whose tem- ratures are between 55.4° F and .7° F. It is therefore suggestive, hough by no means conclusive, to tice the association in time of anges in the distribution of sardine awning (and adults, for that mat-) with climatic changes.

Various sea surface and air tem- rature records show that the west ast of North America (U.S. and nada) experienced a trend of in- easingly warmer conditions from out 1910 to 1941. This trend was en reversed and was followed by creasingly cooler conditions until 53. However, in 1954 and 1955 mperatures again rose. It is impos- ble to state whether the conditions these last two years are merely viations from the cooler trend, or they presage the start of a new riod of warming.

In addition to the distribution and undance of spawning, the accom- nying illustration also shows the rdine landings at San Pedro in the 50-51 through 1954-55 seasons. For veral reasons the catch at San dro in the fall does not vary in rect proportion to the number of sh spawning in the northern center the preceding spring. It is inter- ting, however, that the two years practically no catch were also the o years of practically no spawning this area. This suggests that when sh are present on the northern cen- r spawning grounds in the spring, ey will also be present on the San dro fishing grounds in the fall.

The catch in the fall, however, will so be influenced by local peculiari- es in fish distribution, possible ovements off the fishing grounds id by economic demand. (The catch as probably considerably lower than could have been in the 1954-55 sea- on, owing to economic restrictions.)

The distribution and abundance of rdine eggs in the northern center 1955 are comparable to what they ere in 1954. Barring some unfore- en change in the movements of the sh, this suggests that the conditions or the 1955-56 season will approxi- ate those of the 1954-55 season. *

BAIT RESEARCH

A study of the response of tuna to chemical and visual stimuli in the hope that the information so gained can be utilized in developing a substitute for live bait. That's the "reasons why" for a booklet recently issued by FWS entitled "Reaction of Tuna to Stimuli."

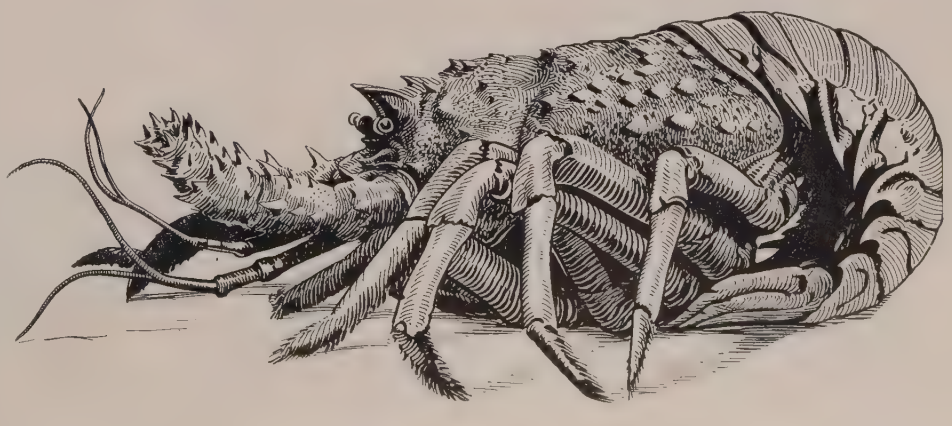
First numerous experiments were conducted on the response of captive little tunny to chemical stimuli. Over 100 known chemical compounds ranging from simple inorganic to complex organic materials, including several reputed fish attractants, were screened. Apart from an apparent sensing of some of the strong-smelling aromatics and an avoidance of some of the highly-colored dyes, the results were negative. It seems unlikely that further screening of chemicals will produce any worthwhile information.

It was found that captive tunny responded with a vigorous feeding reaction to extracts of "food" substances such as skipjack and other fish (flesh, viscera, blood), squid, and shrimp. The response to these several substances was obtained regardless of which one was being fed to the fish as a subsistence diet. However, there was an indication of a slightly better response to a particular extract when the substance from which it was prepared was being used as food. This observation, together with the fact that the fish were being fed on dead, cut-up materials, suggested that the captive fish may have learned to associate the smell of the juices exuding from the cut up food with the act of feeding and that the response to extracts was entirely conditioned by the nature of the food. This would presume that the so-called "attractant" in the extracts is a substance (or substances) common to the body juices of fish, squid, shrimp, and other forms. As the captive tunny will not forage for live bait occurring in the pond, but rather must be hand-fed, it is unlikely that further information on the question of conditioning can be obtained from pond experiments.

It was hoped that even if there was a partial conditioning of the pond fish, tuna in their natural environment might be naturally "conditioned" to associate the smell of living injured or uninjured prey with the act of feeding, and that they would therefore respond to the extracts. This hope was not realized. A sufficient number of sea tests on skipjack schools were conducted to warrant the conclusion that the fish showed no appreciable response to extracts of skipjack flesh and viscera, extracts of yellowfin flesh, and extracts of live bait. Unfortunately no tests were conducted on "pure" schools of little tunny (the species tested in the pond) or yellowfin (which are known not only to eat dead bait on longlines but to respond occasionally to chumming with cut bait). Also, no sea tests were conducted with extracts of squid and shrimp, both of which might be considered a more natural food than skipjack or yellowfin flesh. Nevertheless the negative results obtained from such sea tests as have been conducted indicate that the sense of smell plays little part in the feeding of tuna in their natural environment.

A study was made of the response of tuna at sea to a variety of inedible lures which were used as chum, both with and without extract, after the fish had been initially chummed to

(Continued on page 19)



Harnessing the Resources Of the Sea

THE bounty of the sea has hardly been tapped as a means of feeding the world's hungry millions. Today its resources provide less than 1% of the total food supply, says a United Nations report.

The 139 million square miles of ocean surface—about 2½ times the earth's land area—hold within their depths the potential additional food supply required for the future. By the end of the century, it is predicted, the world's population is expected to reach 4 billion, almost double the present figure.

The vast storehouse of marine resources must be mastered, as agricultural advances may not be sufficient to meet the coming demands for food. "Farming" the seas will be a gigantic task, calling for close collaboration of all branches concerned.

The sea is not only humanity's great unused resources but a truly international one. While the land is divided among nations, the sea belongs to mankind. Comprising about 72% of the earth's surface, the seas are vast enough for all nations, including those without seaboards of their own, to participate in marine agriculture.

The amount of fish caught and consumed today could be increased many times if fishing were no longer an essentially primitive method of finding food, in the manner that "our ancestors roamed the woods in search of game." In addition, the rich plant life of the sea, now serving as food only for fish, is recognized today as a potential food both for men and domestic animals. And scientists calculate that a square mile of ocean produces an average of 13,000 tons of vegetation a year, with a world total probably five itmes that of vegetation on land.

Many private and governmental research institutes have developed new methods of studying the ocean depths, which have revealed strange forms of marine life. But, such international organizations as the Pacific Science Congress, the Indo-Pacific Fisheries Council, and the Food and Agriculture Organization, have called attention to the research still required before the sea's resources can be fully tapped as a source of food supply.

In this connection UNESCO is organizing as broad an international attack on the problems of the sea as it has done for the problems of the arid lands. A program of aid to oceanographic research on a world-wide scale, has been prepared.

To coordinate this program, UNESCO has organized an International Advisory Committee on Marine Sciences, which will meet for the first time this October in Tokyo. A preliminary meeting of scientists was held on this subject in Rome last May. This Committee is expected to coordinate a cooperative long-term international research program.

The program will include such activities as the mapping of the ocean bottom and the study of the soils and sediments, temperature variations and ocean currents conditions, governing plant growth, types of animal life at various locations, diseases and parasites of plant and animal life, and the resources of edible fish in accessible areas.

The idea of "farming" the seas possesses several well-defined advantages, summed up as follows:

The sea contains great quantities of nutrients which, properly directed and supplemented where necessary, could be made to increase the growth of planktonic life, and in turn stimulate the growth of marine animal life.

In marine agriculture, there can be no lack of water such as besets terrestrial agriculture. It is believed that marine plant diseases, where they exist, can be more easily controlled in this environment.

The seas are vast enough for all nations, including those which have no seaboards of their own, to participate in marine agriculture. *

Different Species of Bonito

A description of two species of bonito was contained in Bulletin No. 99 of the California Department of Fish and Game. H. C. Fodsil of the Marine Fisheries Branch, describes in detail the Peruvian and the Oriental species of bonito, and compares them with two other species, the California and the Mexican.

Then the author makes these comments of more general interest:

Within recent years there has been a vast expansion in the fisheries of the world. This has been in response to two principal factors. Both the necessity of economic development of innumerable maritime nations, and the need for additional protein foods have stimulated a world-wide interest in, and exploitation of the latent fishery resources of the oceans.

One of the most abundant sources of protein food is found in the "Scombroid" group of fishes, including such fish as the tuna, skipjack, bonito and mackerel. These are streamlined pelagic, schooling fishes distributed in greater or less abundance, in almost every ocean of the world. Although widely distributed and generally similar in appearance, there is no reason to suspect that in some instances individual species are confined to a given ocean or to a restricted portion of that ocean, and that the stocks of the world are made up of such distinct groups. In other instances it appears that species are in reality cosmopolitan. If our fishery resources are to be intelligently exploited, management will require a precise knowledge of the composition of the total stock and the geographical range of the component species.

Such knowledge is the framework into which life history studies must be fitted. The recognition of larval and juvenile stages, the significance of spawning areas and nursery grounds become productive assets when properly correlated with individual species. The aggregate of such knowledge will provide another measure of abundance to guide those responsible for sustained exploitation. To this end numerous state and federal—domestic and foreign—research agencies have, within recent years directed their concerted efforts to collecting the necessary information concerning the tunas and tuna-like fishes. The information thus obtained helps towards the eventual understanding of the stocks of tuna-like fishes and the relationships of the stock from different areas.

urvey of Breaded Fishery Products

"There is still plenty of room for ther expansion of the fish-stick siness, with roughly 60% of Amern households representing the size the untapped market."

Quoted from a report released by VS, this is one of the conclusions hich resulted from a nationwide rvey of household consumer prefences for breaded shrimp and eaded fish sticks. This report is the st of a series of three analyzing the ta collected.

These recently developed fishery oducts have made spectacular les advances. Fish stick production mped from 7.5 million pounds in 53 to about 50 million pounds in 54. The first half of 1955 was well ead of the same period last year. eaded shrimp production, which arted in a small way after World ar II, rose very rapidly and curntly appears to have leveled off at out 17 million pounds annually.

Lacking information on family use, e industry has been unable to determine if these favorable developments are based on permanent and perhaps expanding markets for fish sticks and shrimp. For the same reason the significance of the phenomenal sales of these products in relation to the market for other fish products could not be evaluated.

The survey represents the tabulated results from a questionnaire mailed out to 2,000 persons, predominately housewives, and returned by 1,797. The households selected were considered to be representative of all American households.

A summary of the data produces these facts:

1. Fish sticks are used in less than 40% of all American households.

2. Only about one homemaker in five uses breaded shrimp.

3. A high percentage of all homemakers trying either cooked or uncooked breaded shrimp became satisfied customers.

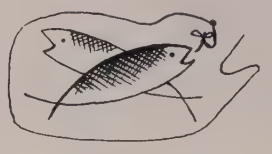
4. The prospects for expanding the market are favorable.

5. Most consumers are indifferent about the variety of fish used in making fish sticks.

6. Breaded shrimp and fish sticks completely replace other fishery products in only a very few households. A greater number but still a minority of the households replying, indicated partial replacement of other fishery products.

7. Consumers are well satisfied with present labeling.

8. There is a marked preference for the 12-ounce breaded shrimp package. A package of the same size is not generally available for fish sticks although there appears to be a considerable demand for it.



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THREE CRUISE REPORTS

1. The Oregon

The *M/V Oregon* returned to Pascagoula on August 27 completing an 18 day commercial scale tuna long line trip in north central Gulf of Mexico.

A total of 652 yellowfin tuna weighing 29½ tons were caught during the trip. The fish ranged in weight from 7 to 215 pounds each with an average of approximately 90 pounds. Nineteen per cent of the fish caught were shark damaged. The remaining whole yellowfin weighed 45,665 pounds.

Ninteeen sets were made during the 14 days fished on the cruise. Except when unfavorable sea conditions were encountered, approximately 100 baskets of gear were run each day, either as one continuous set, or two 50-basket sets (12,870 hooks set for cruise). The gear was normally set with half 10 fathom float lines and half 20 fathom float lines. A variety of bait species were used on most sets including small mullet, cigar fish, balio and herring. There was no apparent bait preference.

Catch rates on individual sets ranged from 1.7 to 11.2 yellowfin per 100 hooks. The average for the trip was 5.06 yellowfin per 100 hooks. In addition, 27 blackfin tuna, 8 *Katsuwonus*, 78 white marlin, 1 blue marlin, 10 sailfish, 2 small swordfish and 178 sharks were landed on the long lines; 16 of the white marlin were tagged and released; 99 sharks were chummed and shot.

Fishing activities were carried out in two general areas. During the first half of the cruise all sets were made approximately 90 miles south of Mobile Bay. After seven days in this area the *Oregon's* brine freezing tank was filled to capacity (14 tons) and the vessel returned to Pascagoula to unload.

During the last half of the cruise a few sets were made in the same area before the *Oregon* moved to an area SSE of the Mississippi Delta and worked between the 600 and 1,000 fathom curves. The largest single catch was made south of Mobile where 88 yellowfin were taken on 104 baskets. The best single catch rate was south southeast of the Mississippi Delta where 56 yellowfin were caught on a 50 basket set for an average of 11.2 fish per 100 hooks.

2. The Gilbert

The research vessel *Charles H. Gilbert* of the U.S. Fish and Wildlife Service returned to its Pearl Harbor base on August 26, completing six weeks of cruising in an area from west of Oahu to east of Hawaii. According to Dr. A. L. Tester, Director of the Pacific Oceanic Fishery Investigations, the primary mission of the cruise was to tag and release as many skipjack tuna (aku) as possible, in order to study the migrations and growth of this commercially valuable fish.

In the course of this latest tagging cruise 821 tuna were successfully marked with a white plastic tube tied through the skin and muscles of their backs, bringing to a total of about 1,700 the number of tagged skipjack released by Service scientists in the Hawaiian area.

Commercial fishermen of the live-bait sampan fleet have already recaptured five marked skipjack, three of them fish tagged during the first part of the recently completed cruise. Although the tagged fish had not been at liberty very long the results indicate that during the summer the schools of small skipjack are relatively sedentary and do not migrate very far nor very fast.

In the recent tagging work emphasis has been placed on marking the larger "season aku," whose abundance determines the success or failure of the summer commercial fishing season. These big fish, weighing 18 to 25 pounds, are hard to handle and release uninjured. Despite this, efforts have been made to tag them because their migrations are believed to be more far-ranging than those of small aku and the recoveries will be more valuable to POFI's program of aiding the expansion of the Hawaiian tuna fishery. Unfortunately, schools of large skipjack have been unusually scarce in Hawaiian waters this season.

Throughout the recent cruise, radio broadcasts were made twice daily to inform the commercial fishing fleet of the location of all skipjack schools sighted. In addition, other information of value to tuna fishermen was forwarded by radiotelephone through the POFI office in Honolulu.

Scientists aboard the *Gilbert* also made observations of such hydrographic features as water temperature and salinity as part of a continuing program planned to discover how the distribution and movements of the skipjack schools may be related to currents and the seasonal movements of water masses. Such relationships could provide clues to the discovery of new fishing grounds beyond the range of the present fishery and could reveal the whereabouts of the schools during the off-season in Hawaiian waters.

3. The Yellowfin

Cruise 6 of the *M/V Yellowfin* for 1955 was from Los Angeles Harbor and return August 8 to 28, 1955. It covered the area along the coast of Baja California from Pt. Eugenia to Magdalena Bay and the area around Cedros Island.

Two purposes: 1. To assess the relative abundance of sardines resulting from the 1955 spawning, and the relative abundance of older sardines, Pacific mackerel, jack mackerel, and northern anchovies; and 2, to tag and release yellowtail wherever available along the route of the cruise.

Results: 65 light stations were occupied. Sardines were sampled at 2 stations, Pacific mackerel at 31, jack mackerel at 23, and northern anchovies at 21. Of the 29 stations at which sardines were taken, 24 yielded sardines of the 1955 spawning season (fish less than 125 mm. standard length), and 17 yielded adult sardines. In general, sardines appeared more abundant in this area than they did during a comparable cruise in 1954. Forty-five per cent of the stations yielded either juvenile or adult sardines as compared with 34% in the same area during the 1954 survey.

The *Yellowfin* traveled a total of 348 miles while scouting for fish; 24 schools were observed, of which it was estimated that 74 contained sardines, 17 Pacific mackerel, 100 anchovies, 13 jack mackerel, and 4 were unknown.

A total of 292 yellowtail were tagged and released during the cruise. 192 of the 207 yellowtail tagged in the 13 Fathom Bank were captured at night with the blanket set. The remaining fish were caught on hook and line.

Bait Research

(Continued from page 15)

he stern of the ship with live bait. There was a momentary response to shiny objects such as strips of tin, to silvery objects such as squares of aluminum foil, and to effervescing objects such as calcium carbide pellets. Similarly there was a momentary response to dead baitfish. The addition of extract had no apparent effect. These results indicate that the sense of vision plays a much greater role in feeding than the sense of smell. However, neither these visual lures nor a "drag-lure array" (designed to simulate a school of live bait) towed behind the vessel was successful in holding the fish at the stern.

The captive tunny in the pond were used to test a variety of edible lures in which the qualities of visual attractiveness and palatability were combined. Gelatin capsules, pieces of macaroni, and strips of agar treated with concentrated extract were eaten more frequently than when they were not treated with extract. In some of the edible lures, visual attractiveness was increased by coating or impregnating with aluminum powder. In a series of experiments in which the captive tuna were presented alternately with macaroni pieces and agar strips, both cooked in concentrated extract and made silvery with aluminum, the fish showed a preference for the agar. The preference may have been associated with the texture of the material. It became more pronounced with successive testing, suggesting that a learning process was involved.

Sea tests with these edible lures gave negative or inconclusive results. Unfortunately the tests were made during the autumn, when skipjack schools were both scarce and erratic in their behavior. Several of the schools which failed to respond to the edible lures also failed to respond to live bait. The experiments with the more promising substances (particularly with agar strips impregnated with concentrated extract and aluminum powder) should be repeated during the regular summer skipjack season. If they again fail to attract our local skipjack schools, which are notoriously difficult to chum with live bait, it does not necessarily follow that they will also fail to attract skipjack, yellowfin, or other tuna species elsewhere.

In view of the lack of success in attracting local skipjack schools to the stern of a vessel and holding them there with the many materials and combinations of materials which have been used, we may ask what quality of attraction is missing. The missing quality is probably motion—the rapid motion of a living fish or squid, or the rapid motion of a lure trolled through the water. It may be that motion is a prerequisite to attraction by artificial lures. Other qualities of likely importance are size, shape, appearance, texture, and taste of the lures.

Imparting motion to a small object (say, 2 to 4 inches in length and ½ to 1 inch in diameter) is a difficult although not impossible task. One method is to use the energy of a chemical reaction and the principle of jet propulsion. Once a satisfactory "motor" has been devised, other problems concerning shape, speed, buoyancy, nature and direction of movement, and fabrication of a self-propelled lure may be tackled.

An investigation of methods of imparting motion to small objects is presently underway. If a promising mobile lure can be devised, it will be tested on schools of skipjack at sea.*

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Plight of the Tuna Fishermen

(Continued from page 12)

the canner had to partially subsidize some vessels of the American fleet to offset the extremely high costs to the vessel owners of these lay-up periods. This depleted cash resources and ultimately backed up in the banks who found themselves with paper on innumerable fishing vessels, co-signed by the vessel owners and the canners.

While the increased investment in fishing vessels materially enhanced the bargaining position of the canners, it shortly put all concerned in the position of changing money from one pocket to another without anyone gaining from the transaction.

Other complicating factors began to enter the picture through investments in fringe firms and businesses, even night clubs, office buildings, real estate, and other items the investors hoped would produce sufficient revenue to keep their vessels afloat during high import periods.

Little by little, these investments got so involved, and the complications became so great, that the fishing vessel owner primarily interested in combating high imports soon found himself his own enemy, since an issue that might be beneficial for the fishing fleet could be seriously detrimental to his other interests.

Thus, the canner has emerged during the last few years as the businessman of the processor-producer combine. He has virtually gained control of the entire operation from catching the fish to processing them and completing the marketing of the finished product. He belongs to numerous active organizations with branches around the country, including Washington.

There is a well-thought-out plan of action behind his demands and decisions. The measures he presents are logical, and they are likely to receive audience and action.

The boat owner, on the other hand, also belongs to organizations. They are well-founded with definite purpose . . . and staffed by competent personnel. The gimmick, however, appears to lie in the fact that no two fishermen can agree upon the points at issue.

During the last couple of years the fishermen have secured their own market surveys . . . accurate data on what percentage of the market they held. This turned out to be a powerful factor toward their claim to a fair share of the market. In the past the American fishing fleet has taken too much for granted; apparently they have been "sold down the line" by certain factors . . . perhaps the canners, or the State Department, or both.

Now it appears that the American fishing fleet must step out in a battle of survival against tremendous odds they have allowed to accumulate against them. It can be done. But first the fishermen and boat owners must agree upon the issue and methods for relief.

They can either do this or they can lose—it is as simple as that. The canners set out together to build a market, putting time, money and effort into it.

The boat owners and fishermen need a well-planned, well-coordinated public relations and advertising program to acquaint the American public with the facts of the import situation. The theme might well be "American Caught & Canned" tuna. A symbol designating such tuna could appear upon the labels of the finished product throughout the nation.

The American housewife could be educated to watch for this label and to buy this product. A price adjustment might be effected, making the American product a premium piece of merchandise, as is the case in certain other industries. For example, a recent Associated Press wire release datelined Tokyo is quoted below, in part:

"Tokyo food consumers got some stomach-jolting news today. Food dealers worry what it will do to sales. Health authorities announced these results of a three-month spot check of 2144 food stores in this city of nearly 8,000,000:

". . . 70% of fish items contained over 70,000 colitis germs per gram (0.03 ounce) . . .

"Nearly 5000 Tokyo residents were stricken with food poisoning from January 1 to September 1 and ten deaths were attributed directly to it."

The inauguration of a public relations and publicity problem would provide protection and afford the American fleet its just share of the American market . . . without governmental action to establish either a tariff or a quota.

Such a program was first proposed by Pan American Fisherman magazine back in 1952. Its fairness seems self-evident; it would maintain the American market on a strictly competitive basis.

Some stiff objections might arise from the canners. But the vessel owners and the fishermen must now undertake what the canners did long ago—take out some publicity insurance to protect their investment in the industry and not depend upon either the canners or the government to guarantee their stake in the American market.

Pacific Coast Fisheries Show Decline

During 1953 the production of fish and shellfish in the Pacific Coast States (Washington, Oregon, and California) amounted to 734 million pounds, valued at over 84 million dollars to the fishermen, according to the Fish and Wildlife Service. This represented a decrease of nearly 9 million pounds, or 12%, in quantity; and 6.5 million dollars, or 7% in value compared with the landings of the previous year.

Pacific sardine landings (9 million pounds) were the lowest since the fishery became important early in World War I. During 1952 only 1 million pounds of sardines were landed, compared with nearly 32 million pounds landed in 1951. During the period 1934-1944, the average annual receipts of this species amounted to approximately 1.15 billion pounds.

Tuna receipts (304 million pounds) were 19 million pounds less than 1952, while salmon (93 million pounds) rose 23 million pounds during the same period. However, since 1952 was an off-cycle year for pink salmon in Puget Sound, a comparison with that year does not give an accurate picture of the salmon fishery. In 1951, which was a pink salmon year, nearly 98 million pounds of salmon were landed at West Coast ports.

A complete bulletin on the above is available free from the Division of Information, U.S. Fish and Wildlife Service, Washington 25, D. C.

EPORT FROM WASHINGTON

(Continued from page 8)

FOURTH ROUND" OF GATT NEGOTIATIONS.--The United States intends to conuct tariff negotiations with 25 countries with a view to reducing tarffs here and in other countries. Among the domestic products to be conidered are:

Canned sardines; canned herring; frozen swordfish; frozen black od; frozen fresh water fish and swordfish; pickled or salted salmon (not n airtight containers); and caviar and other fish roe (not in airtight ontainers).

The coming negotiations are expected to be the most far-reaching ince the initial negotiations under the General Agreement on Tariffs nd Trade in 1947. They are expected to get under way in January, in eneva, with a view to placing the first tariff reduction in effect by une 30, 1956. Public hearings will be held in this country for suggesions and guidance, starting with the Tariff Commission about October 31.

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ORTHWEST SALMON INDUSTRY ORGANIZED.--A committee of the Association of acific Fisheries, headed by G. P. Halferty, Chairman, and consisting of harlie Alhadeff, Sid Rosenberg and Tom Sandoz, has alerted the salmon ndustry to new and continued efforts to destroy the salmon runs, either hrough construction of dams or diversion of water. In a memorandum they oint out that the supply of salmon and steelhead at all points in Oregon, ashington and Alaska is consistently decreasing. The committee has asked or suggestions as to how to fight this continued trend toward destruction of valuable fishery resources.

INK SALMON TREATY WITH CANADA.--Governor Arthur B. Langlie of Washington as announced the appointment of 15 representatives of the various segents of the commercial and sport fishing industries to assist him in etting forth Washington State's position on the possible need of a treaty etween Canada and the United States for the protection and regulation of ink salmon.

For a long time there has been a feeling that pink salmon in bounary areas should be regulated by a treaty similar to that now prevailing n sockeye salmon. Robert J. Schoettler, Washington State Director of isheries, will act as ex-officio chairman of the committee, and the first eeting is expected to be held the latter part of October.

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APANESE TRADING ORGANIZATION.--Two business groups have agreed to merge o restore one of Japan's huge prewar combines, the Mitsu Bussan Trading ompany.

The new company will start business next April. It is expected to andle about 15% of Japan's export ond import trade, will have a capital f about 2,900 billion yen ($8 million), a staff of 4,500 and 33 overseas ranches throughout the world.

Japan's monopoly interests--the Zaibatsu--were broken up under the economic program of the Allied occupation. In 1947 Mitsui Bussan was split into more than 200 small companies.

CANNED FISH TO THE PHILIPPINES.--Canned fish from the United States are among the commodities on which the Philippines will not impose an import tax when the revised trade agreement between the United States and the Philippine Republic goes into effect January 1.

According to a dispatch from the U.S. Embassy in Manilla, products not now subject to the 17% tax on foreign exchange will be the same products exempted from the new import tax which is provided for in the revised trade agreement. Under terms of the legislation, canned fish are among the items on which the import tax will not be imposed in 1956.

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JAPANESE SALMON UP, TOO.--The 1955 Japanese high seas salmon catch final figures for the season, which ended last month, will probably be about 65 million fish. This compares with last year's catch of 20.5 million fish and the preliminary estimate for this year's catch of 47.6 million fish.

In an effort to prevent this year's greatly increased production from wreaking havoc with salmon price levels, the nine companies controlling most of Japan's canned salmon have organized an export control agency to fix prices, adjust sales volume, and arrange financing for companies which would otherwise have to dispose of stocks at sacrifice prices.

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FISHERY MOTION PICTURES.--Borrowing a fishery motion picture is just as easy as borrowing a book from the public library and just as inexpensive. The Branch of Commercial Fisheries is now distributing its films through almost 100 film distribution libraries strategically located throughout the United States as well as directly from the Fish and Wildlife Service, Department of the Interior, Washington 25, D. C.

Prints of these films can be borrowed free of charge and only the return postage is paid by the borrower. Complete information can be obtained by requesting Fishery Leaflet No. 225 entitled "Fishery Motion Pictures" which contains a listing of the available films and the method for obtaining them. All films must be run on 16 mm. sound projectors which are easy to operate and are obtainable in almost any community. The films are entertaining as well as educational and there are films listed which will be of interest to almost any kind of audience.

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// NEW POFI PUBLICATION.--Fishery research vessels of the U.S. Fish and Wildlife Service based in Hawaii have during the past few years done a considerable amount of trolling around the Hawaiian, Line, and Phoenix islands and on the open sea between these central Pacific island groups. Some of this fishing has been done deliberately to test the commercial trolling possibilities close to the shores of the islands, but the greater part of it has been done routinely on the runs incidental to longlining, purse-seining, and oceanographic work.

A new publication of POFI, "A Summary of Sightings of Fish Schools and Bird Flocks and Trolling in the Central Pacific" (Special Scientific Report - Fisheries No. 154), by fishery biologists, brings together and analyzes the results of a good deal of this trolling as well as the observations of surface signs of tuna that are recorded by wheel watches on all runs of POFI vessels.

The GLOBE

An International News File Compiled from FOREIGN REPORTS

Great Britain.—Fish sticks have been successfully introduced to the British market by four firms reporting excellent sales. New equipment is being installed to keep pace with the orders. Fish sticks are being produced from boneless cod, but producers expect to use other varieties as soon as possible. Producers predict a rapidly expanding market for this product.

Jamaica.—Rich banks of ocean shrimp have been discovered off the coast of Jamaica by an exploration unit. This find of pink shrimp may develop into a lucrative dollar-earner for Jamaica. Experts are exploring the sea area south of the Island for shrimp fishing grounds of the type which have made the Campeche Banks off Mexico's east coast world famous.

Japan.—The Japanese frozen tuna export industry desires to begin the use of colored plastic ribbon to mark the destination of frozen fish, a representative of the Japan Frozen Food Export Association announced. At the present time, shipments of frozen tuna destined for different canneries in the United States may all be carried in the same hold of the ship, separated only by a net. During the voyage, or during loading and unloading, the nets sometime become tangled and the fish are moved about and the identity of shipments is destroyed; then there is no way to tell which fish belong to which buyer. The new plan is to attach a plastic ribbon to the tail of the fish at the time of shipment, color coded according to the buyer at the point of unloading.

Mexico.—The August and September closed season for fishing shrimp at sea along the coasts of Baja California, Sonora, Sinaloa, and Nayarit has been removed and trawl fishing is being allowed to continue. The new closed season will be March 18 to April 15 with a possible extension to May 15 depending upon shrimp-spawning intensity.

Norway.—A small Norwegian canner of tuna in Western Norway reports strong competition from Japan where both the raw material and operating costs are much cheaper. A special price for Norwegian tuna for canning comes into being only after the catch has reached a certain amount. This quantity was not taken last year and the prospects do not appear favorable this season.

Norway.—The first shipment of 10 metric tons of frozen fish was shipped from Norway to Australia this summer by an association of Norwegian frozen fish producers. For the past two years small quantities of frozen fish have been tried on the Australian market and this recent shipment is viewed in Norwegian fishing circles as the first step in opening up a large new market.

Panama.—It is believed that the jumbo shrimp which constitute the bulk of Panama's export product are less than a year old, and probably about seven months. When spawning, each shrimp lays about a million eggs, according to an FOA biologist assigned to Panama. The ex-vessel price paid to fishermen for shrimp (50 U.S. cents per pound) is the highest ever, and prospects for continued good catches and good prices are very bright.

Peru.—The past Peruvian bonito season was normal and inventories were well disposed of on the international markets but at low prices because of Japanese competition in both canned and frozen tuna. The tuna industry which is located farther north and whose catch is mostly exported in frozen form reports poor prices and growing unemployment. Fishermen are turning to swordfish and shrimp to offset the low prices paid for fresh tuna.

Scotland.—Successful experiments in vacuum-drying or dehydrating fish have been reported by a small factory in Aberdeen, Scotland. The new method may handle surplus catches without incurring heavy cold-storage costs or loss through deterioration. The complete product is a small "block" of fish measuring only a few square inches and weighing a few ounces. Placed in water for eight or nine hours it becomes a slab of fresh fish. Fresh or salted fish, fillets or unfilleted, can be reduced to the vacuum product.

Spain.—There is a growing interest in Bilboa area of Spain in the export of canned tuna fish to the United States. Difficulties in obtaining export permits from the Ministry of Commerce have been resolved, while the increased use of live bait by the tuna fishermen in the area has resulted in greater catches which now exceed domestic needs.

Spain.—Total catches of fish entered through the port of Vigo, Spain, during April increased substantially in volume over the previous month, and were about 55% larger than April 1954, a U.S. consular dispatch from Vigo points out.

Fish-canning operations during April improved substantially over the previous month due to the availability of "castaneta," a species of the albacore family which is packed and sold as albacore in the home market and exported to most of the South American countries.

The industry could have operated at a still higher level in view of the availability of fish, but canners continued to save their small stocks of tinplate in anticipation of the sardine and albacore tuna season.

Tagged Skipjack Caught

On August 24 a 189-pound ahi or yellowfin tuna was caught by the Hilo flagline vessel *Irene C.* This in itself is not an unusual fish story. However, when the big ahi's stomach was opened up it was found to contain a 5-pound aku (skipjack tuna) bearing a white plastic tag on its back.

The tag had been attached to the aku two days earlier, on the 21nd, by scientists aboard the U.S. Fish and Wildlife Service research ship *Charles H. Gilbert,* and the fish had been returned alive to the water to enjoy (very briefly, as it turned out) the not-so-carefree life of a Hawaiian tuna. Other recoveries of tagged skipjack released by the Pacific Oceanic Fishery Investigations have been due entirely to the cooperation of commercial fishermen; this is the first instance in which the biologists have been able to enlist the cooperation of a fish.

According to Dr. A. L. Tester, director of POFI, this somewhat bizarre recovery is only the eighth from a total of 1,724 aku tagged and released in Hawiian waters during the past year. All of the seven other recaptures were made aboard skipjack sampans by the usual pole-and-line fishing method.

The Hilo fish had apparently not moved very far either before or after being engulfed by the big ahi, for his captor was in turn captured very close to where the tagging had originally been done. The other tagged aku recaptured off Waianae, although they had been at liberty from three to five weeks, had made no spectacular migrations.

The objective of this skipjack tagging program is to learn something about the rate of growth of these small tuna and about their seasonal migrations. Although the aku is the most valuable commercial fishing resource in Hawaii and supports the only fish canning industry in the Territory, the fishery is confined almost entirely to the summer months and to a narrow zone immediately around the Islands. Information about the movements of the skipjack schools gained from a study of tag returns may eventually enable the Hawaiian sampan fleet to expand into new fishing grounds and to extend its fishing season over a greater part of the year.

Recaptures of tagged aku, although few as yet, have been highly encouraging to the fishery biologists. They show that the method as applied to aku will work, and that these active, nervous, easily injured fish can not only withstand the handling necessary for tagging but also recover quickly from the wound caused by tying a plastic tube through the skin and muscle of their backs.

Fish on $64,000 Menu

Life Magazine, September 26 issue carries on page 181 a description o the glamour fish dish which wa included in the Buckingham Palac dinner . . . the meal which wo $64,000 for Captain McCutchen o TV.

Louis Diat, who supervised th preparation of the dinner at the Bru sels Restaurant, is an old friend o the fishing industry, and had charg of the serving of fishery products the last two Food Editors Confe ences at the Waldorf in New Yor

What's New IN SUPPLIES and EQUIPMEN

Marine Radiotelephone

An attractive new marine radiotelephone, the Model AE-42, has a power input rating of 45 watts, provides six crystal controlled transmitting and receiving channels between 2000 and 6000 kilocycles. Tunable, standard broadcast band and signal gate for muted standby are other receiver features.

AE-42 represents a new departure in styling and design. Compact—overall height less than nine inches. Controls are held to a minimum for ease of operation by non-technical personnel. Each equipment has provisions for remote control which may be subsequently added. The design arrangement offers many time saving advantages.

Write the manufacturer: Applied Electronics Company, Inc., 1246 Folsom St., San Francisco 3, California.

Portable Cooking Grid

A new cooking grid folds into a convenient carrying handle. No metal case is needed, so the whole stove weighs only five pounds. It boils coffee or cooks a skillet of food surprisingly fast, and you can use it in a rowboat while fishing, in the station wagon while traveling, on the dining room table when utilities fail —or anywhere else, for that matter.

Your sporting goods or hardware store should have the new Bernz-O-Matic, which sells for only $8.95, complete with full cylinder of propane gas, or write Otto Bernz Company, Inc., 280 Lyell Avenue, Rochester, New York.

Reverse Gear Shifter

Cleveland Aero Products, Inc whose marine division manufactur the popular Capco-Matic Hydraul Reverse Gear Shifter, has moved in a modern one-story plant at 1380 Triskett Rd., Cleveland, Ohio.

The company, with long exper ence in the production of equipme for airplanes, established its Mari Division nearly two years ago for i Hydraulic Reverse Gear Shifter f boats with diesel or gasoline engin of 50 to 300 horsepower. This shift can be operated from one or mo stations and provides easy, finger-t control. Well adapted to fishing boa and commercial craft, it not on eliminates shifting difficulty but pr motes greater maneuverability ar control with consequent efficien and safety.

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rapping Tuna

A unique method of fishing for na is employed in the Mediterran- n and reported in "World Fishing." Sicily, the method is known as a nattanza." The technique is based two facts known about the tuna's bits:

(1) In the spring and early sum- er tuna comes in close to the shore spawn. (2) Tuna has a left-handed nse of direction, that is, when con- onted with a net, it will always tempt to go around it to the left, d never to the right. A series of uare, box-like nets are laid out om the coast at various points where is known that tuna are likely to ss.

The trap is entered through an ening in the net which is nearest e shore. Once inside, the tuna find emselves in an enclosure, the sides id floor of which are composed of ry strong netting. As they instinc- vely turn to the left in search of escape route, they find what ap- ears to be an exit, but this only ads them into another net con- ructed on the same principle. The ries of nets culminates in the *cam- a della morte* (chamber of death).

The "mattanza," the slaughter of the tuna, consists in the raising of this last net and the gaffing of the tuna by men stationed on four large barges that surround it. About 100 men, divided equally among the four barges, are usually required for this last stage in the operation. The net is lifted gradually with even tension from each quarter until the tuna are brought to the surface. The net is then made fast, and the rolling begins.

The fish are quite large, averaging 6 ft. in length, with some running as large as 10 ft. and they create a considerable furor with their flounderings. The men use iron or steel-tipped gaffs on long wooden poles to bring the fish to the side of the barge where other fishermen haul them over with short hand-spikes.

Fat Composition of Fish

The net result of some tests on the chemical composition of tunas, mackerels and other fish can be summarized as follows:

1. The fat content of mackerel flesh, whole mackerel, and plankton was estimated monthly for 18 months. A definite relationship was seen between the flesh fat and that of the whole fish. The maximum was reached from Oct.-Nov. for both the flesh and the whole fish, with a minor peak in March-April.

Plankton fat was unstable and fluctuated. The fat content of plankton was above 10% in Nov.-Dec. and in March, which might have contributed to the fish fat because of their intensive feeding. The intensive feeding of mackerels in Oct.-Nov. and again in March-April and their fattiness are correlated with the fattiness of the plankton during this period. However, the major peak of plankton fat does not coincide with the major peak of fish fat. It is suggested that this might be due either to poor feeding or selective feeding.

2. The seasonal variations of the liver weight, oil content, and vitamin A content of mackerel were studied. Both the liver weight and oil content were affected by the type of food as well as the physiologica leffect of the reproduction. The liver weight of the female increased very much at the time of egg formation and rapidly declined during spawning, but in the male the liver weight does not change so noticeably. In February, the low content of Vitamin A was noticed in spite of the low oil content of liver caused by the effect of the differences in feeding.

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HELP SAVE ONE FRIEND FROM CANCER

Tens of thousands with cancer will lose their lives needlessly this year. They could have been cured by early diagnosis and prompt treatment.

Will one of these unfortunate victims be a friend of yours? It could happen. We know that cancer strikes one in four.

There's a way to help that friend, and thousands of others. That's by helping the American Cancer Society spread its educational message as widely as possible.

Money you contribute improves services to patients, arms everyone with protective information about cancer, and pays for research to conquer this cruelest of diseases.

When you give your dollars to the American Cancer Society, you are making an investment that pays off in the saving of human lives. Perhaps the life of one friend.

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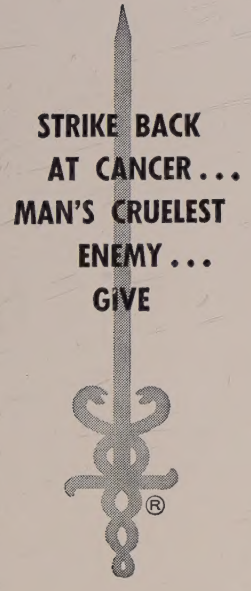

American Cancer Society

GENTLEMEN:

I want to help conquer Cancer.

( ) Please send me free information about Cancer.

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City_____ Zone____ State_____

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POSTMASTER: Second class mail. If undeliverable notify sender stating reason on Form 3579, Pan American Fisherman, P.O. Box 650, Orange, Calif.

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NOV. 3-12

The 1955 observance of National Tuna Week will be as beneficial to the California tuna industry as the industry itself makes it!

Your Association has cut the pattern for a full, national publicity and promotional program embracing television, radio, and related products advertising.

Millions of consumers are going to be made more aware of California tuna—its goodness, versatility, and place on the family menu.

With all of the resources at the industry's command backing up the campaign, this important annual food observance week can move more product—and keep it moving.

Let's make the very most of the opportunity . . .

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